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Research Article

PSYCHOLOGICAL RESILIENCE AND POSTDEPLOYMENT SOCIAL SUPPORT PROTECT AGAINST TRAUMATIC STRESS AND DEPRESSIVE SYMPTOMS IN SOLDIERS RETURNING FROM OPERATIONS ENDURING FREEDOM AND IRAQI FREEDOM

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Background: *A number of studies have examined the prevalence and correlates of posttraumatic stress disorder (PTSD), depression, and related psychiatric conditions in soldiers returning from Operations Enduring Freedom and Iraqi Freedom (OEF/OIF), but none have examined whether factors such as psychological resilience and social support may protect against these conditions in this population.* **Methods:** *A total of 272 predominantly older reserve/National Guard OEF/OIF veterans completed a mail survey assessing traumatic stress and depressive symptoms, resilience, and social support.* **Results:** *Resilience scores in the full sample were comparable to those observed in civilian outpatient primary-care patients. Respondents with PTSD, however, scored significantly lower on this measure and on measures of unit support and postdeployment social support. A hierarchical regression analysis in the full sample suggested that resilience (specifically, increased personal control and positive acceptance of change) and postdeployment social support were negatively associated with traumatic stress and depressive symptoms, even after adjusting for demographic characteristics and combat exposure.* **Conclusions:** *These results suggest that interventions to bolster psychological resilience and postdeployment social support may help reduce the severity of traumatic stress and depressive symptoms in OEF/OIF veterans. Depression and Anxiety 26:745–751, 2009.*

Key words: *veterans; combat; soldiers; posttraumatic stress disorder; resilience; social support*

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INTRODUCTION

A large number of soldiers serving in Operations Enduring Freedom and Iraqi Freedom (OEF/OIF) are returning from their deployments with posttraumatic stress disorder (PTSD), depression, and related psychological problems that impair functioning and quality of life.[1] Although several studies have examined the prevalence and correlates of these conditions in this population,[2,3] little research has examined factors that may be protective against traumatic stress and depressive symptoms.

Psychological resilience and social support may protect against the development of traumatic stress[4,5] and depressive symptoms.[6] Psychological resilience and related constructs such as hardiness are characteristics that enable an individual to adapt positively to adversity and that confer protection against the development of psychopathology.[5,7] They have been shown to protect against the development of PTSD following combat in Vietnam veterans[4,8] and Army Reserve soldiers.[9] Higher perceived social support, which is operationalized as an individual's perception or experience of helpful and unhelpful social interactions, is also negatively associated with PTSD[10,11] and depression,[5] with higher perceived social support associated with lower risk of PTSD[4,12,13] and depression.[5] These findings suggest that increased psychological resilience and perceived social support may help protect against the deleterious effects of traumatic stress and depression.

To date, however, no known study has examined variables that may confer protection against traumatic stress and depressive symptoms in OEF/OIF veterans. An examination of differential aspects of resilience and social support is important because it may provide insights into cognitive, behavioral, social, and spiritual factors that may protect military personnel exposed to trauma against the development of PTSD, depression, and related conditions, and potentially inform training and treatment strategies to enhance resilience to stress. The purpose of this study was to: (1) provide a descriptive analysis of aspects of resilience endorsed by OEF/OIF veterans; (2) compare endorsements of various aspects of resilience between OEF/OIF veterans with and without PTSD; and (3) examine whether resilience and social support may protect against traumatic stress and depressive symptoms after controlling for demographic characteristics and severity of combat exposure. We hypothesized that OEF/OIF veterans would report relatively high levels of resilience in general, that compared to veterans without PTSD, veterans with PTSD would score lower on measures of resilience and social support, and that increased resilience and social support would be negatively associated with severity of traumatic stress and depressive symptoms.

METHODS

SAMPLE

Respondents were 272 OEF/OIF veterans from Connecticut who completed the Connecticut OEF/OIF Veterans Needs Assessment Survey (dates of military service: 01/03–03/07). This survey was developed to identify the salient needs of OEF/OIF veterans in Connecticut and provide recommendations for legislative and public policy initiatives to improve readjustment to civilian life. The target population was all Connecticut veterans who served in OEF/OIF since 2003. Potential respondents were identified by the inspection of copies of discharge papers (DD-214s) that were sent to the Commissioner of Veterans Affairs for the state. Her staff identified eligible veterans and selected the first 1,050 (alphabetically) for the target sample. One thousand and fifty surveys were mailed and 285 were returned (27.1% return rate). A reminder postcard was sent 1 week after the surveys were mailed. Respondents were older than nonrespondents in the sampling frame (33.4 versus 31.3 years, $t = 2.87$, $P = .004$). On average, surveys were completed 26.9 months (standard error of the mean [*SEM*] = .7) following return from deployment. Institutional review boards of the Yale University, the Central Connecticut State University, and the VA Connecticut Healthcare System approved the study.

ASSESSMENTS

The *Connor–Davidson Resilience Scale* (CD-RISC[14]) is a 25-item self-report assessment of psychological resilience. Items are scored on a 5-point range: "0" for "Not true at all," "1" for "Rarely true," "2" for "Sometimes true," "3" for "Often true," and "4" for "True nearly all of the time." Total scores, which range from 0 to 100, and five subscales, which were generated using exploratory factor analysis in the initial validation study of this instrument,[14] are computed: (1) personal competence, (2) tolerance of negative affect and stress-related growth, (3) acceptance of changes, (4) personal control, and (5) spiritual orientation to the future. In this sample, Cronbach's α on CD-RISC items was .94.

The *Combat Experiences Scale* (CES) is a 15-item self-report instrument from the Deployment Risk and Resilience Inventory (DRRI,[15,16] available upon request from: http://www.ncptsd.va.gov/ncmain/assessment/assessmt_request_form.html). It assesses exposure to combat, such as firing a weapon, being fired on by enemy or friendly fire, and witnessing injury and death. Higher scores represent greater combat exposure. A previous validation study in OIF veterans found that CES scores correlated positively with measures of PTSD and depression symptoms and negatively with mental health functioning.[16] In this sample, Cronbach's α on CES items was .93.

The *Posttraumatic Stress Disorder Checklist—Military Version* (PCL-M[17]) is a 17-item screening instrument based on diagnostic criteria for PTSD. Respondents who scored ≥50 and who met B, C, and D criteria for PTSD were identified as screening positive for PTSD. This definition provides a conservative estimate of the prevalence of PTSD, which corresponds to *Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition* criteria for PTSD. Cronbach's α on PCL-M items was .96.

The *Patient Health Questionnaire—9* (PHQ-9[18]) is a nine-item self-report screening instrument for depression derived from the clinician-administered Primary Care Evaluation of Mental Disorders. Higher scores indicate greater depressive symptoms, with scores ≥15 indicating a positive screen for depression. Cronbach's α on these items was .92.

The *Unit Support Scale* (USS) is a 12-item self-report instrument from the DRRI[15,16] that assesses the amount of assistance and encouragement in the war zone from unit leaders and members, and the military in general. Questions include, "My unit was like a family to me," "My superiors made a real attempt to treat me as a person,"

and "I could go to most people in my unit for help when I had a personal problem." A validation study in Gulf War veterans found that scores on the USS correlate negatively with measures of PTSD, depression, and anxiety.[15] In this sample, Cronbach's α on USS items was .93.

The *Postdeployment Social Support Scale* (PSSS) is a 15-item self-report measure from the DRRI[15,16] that assesses postdeployment emotional support and instrumental assistance provided by family, friends, coworkers, employers, and community. Validation studies in OIF and Gulf War veterans found that PSSS scores correlated negatively with measures of PTSD, depression, and physical symptoms and positively with measures of physical, mental, and cognitive functioning.[15,16] In this sample, Cronbach's α on these items was .82.

DATA ANALYSIS

Logarithmic base 10 transformations were used to transform nonnormally distributed continuous variables (e.g., PCL-M scores) prior to analysis. Demographic characteristics were compared using independent-samples t tests and χ^2 tests. Scores on each of the CD-RISC items by PTSD status were compared using univarate analyses of covariance (two-tailed, $\alpha = .05$) with demographic variables that differed between the groups entered as covariates. Cohen's d values ($[\text{Mean}_{\text{group1}} - \text{Mean}_{\text{group2}}]$/pooled standard deviation) were computed to estimate effect sizes of group differences.[19] Post hoc t tests were used to compare total CD-RISC scores to norms reported in Connor and Davidson[14] and to examine group differences on individual CD-RISC items, with $P < .01$ considered significant in the latter analyses.

Hierarchical regression analyses were conducted to examine predictors of traumatic stress and depressive symptom severity. All respondents, including those with and without PTSD and with and without positive screens for depression, were included in these analyses. Continuous scores on the PCL-M and PHQ-9 were entered as dependent variables in separate analyses. Variables hypothesized to be related to PTSD and depressive symptoms were entered as independent variables. Step 1 included demographic variables (age, sex, race/ethnicity, education, relationship status, duty type: active versus reserve), Step 2 included a measure of combat exposure (CES), and Step 3 included potentially protective factors (USS, PSSS, CD-RISC). Complete data were available for 255 respondents.

RESULTS

DEMOGRAPHIC CHARACTERISTICS, COMBAT EXPERIENCE SEVERITY, AND PSYCHOSOCIAL MEASURES

In the full sample, mean age was 34.9 ($SE = .4$), 89.4% were White, 82.4% completed at least some college education, 27.8% were active duty, and 72.2% were in the National Guard or reserves: 87.4% were in the Army, 9.1% Marines, 2.2% Air Force, and 1.3% multiple branches. Demographic characteristics and scores on combat experience and psychosocial measures by PTSD status are given in Table 1. The PTSD group was younger than the no PTSD group, but did not differ by sex, race/ethnicity, education, relationship status, and service type. They scored higher on the CES (large effect size), and lower on the postdeployment social support (large effect size) and unit support (medium effect size) measures.

Mean PCL-M scores were 35.9 ($SD = 18.0$) for the full sample, 64.3 ($SD = 10.2$) for respondents with PTSD, and 27.8 ($SD = 9.7$) for respondents without PTSD. Mean PHQ-9 scores were 7.3 ($SD = 6.9$) for the full sample, with respondents with PTSD ($M = 16.5$, $SD = 5.9$) scoring higher than respondents without PTSD ($M = 4.6$, $SD = 4.4$; $t = 16.96$, $P < .001$, $d = 2.29$). Forty-three (15.8%) respondents in the full sample screened positive for depression, with respondents with PTSD more likely than those without PTSD to have a positive screen (56.7 versus 4.3%, $\chi^2(1) = 95.63$, $P < .001$). Combat experience, unit support, and postdeployment social support scores were consistent with those observed in other veteran samples.[15,16,20]

CD-RISC scores by PTSD status are given in Table 2. The mean resilience score in the full sample was 73.8 ($SD = 16.1$). Compared to normative scores reported in Connor and Davidson,[14] this score is lower than that of the general population ($M = 80.4$, $SD = 12.8$; $t = 6.44$, $P < .001$) and higher than that of psychiatric outpatients ($M = 68.0$, $SD = 15.3$; $t = 2.21$, $P = .028$), but consistent with that of primary-care patients ($M = 71.8$, $SD = 18.4$; $t = 1.13$, $P = .26$). The mean score of the no PTSD group was lower than that of the general population ($t = 2.90$, $P = .004$), but higher than that of psychiatric outpatients ($t = 4.38$, $P < .001$). The mean score of the PTSD group was consistent with that of civilian GAD ($t = 1.29$, $P = .20$) and PTSD patients ($t = 0.65$, $P = .51$). The PTSD group scored lower than the no PTSD group on total CD-RISC scores and on all of the factor scores except spiritual influences. Post hoc t tests showed that respondents endorsed lower ratings on all of the resilience items (all Ps $< .001$), except "Fate or God can help" ($P = .70$), "I sometimes have to act on a hunch" ($P = .08$), and "Most things happen for a reason" ($P = .02$).

Table 3 shows the results of a hierarchical regression analysis that examined predictors of PCL-M scores in the full sample. Increased combat experience scores were positively associated and postdeployment social support and resilience scores were negatively associated with PTSD symptoms. A separate regression analysis evaluated which subscales of the CD-RISC were associated with PCL-M scores. The subscales personal control ($\beta = -.39$, $t = 4.95$, $P < .001$) and acceptance of changes ($\beta = -.37$, $t = 4.58$, $P < .001$) were significantly negatively associated with PTSD symptoms; personal competence/tenacity, trust instincts/tolerate negative affect, and spiritual influences were not (all βs $< .16$, all ts < 1.55, all Ps $> .12$).

Higher scores on measures of resilience ($\beta = -.37$, $t = 4.89$, $P < .001$) and postdeployment social support ($\beta = -.23$, $t = 3.17$, $P < .001$) were also negatively associated with depressive symptoms assessed by the PHQ-9, even after adjusting for all of the covariates given in Table 3. The subscales personal control ($\beta = -0.26$, $t = 2.69$, $P = .008$) and acceptance of

TABLE 1. Demographic, combat experience, and social support measures by PTSD status

	No PTSD	PTSD	F or χ^2	P	d
N	225	59			
Age*	34.0 (0.6)	31.1 (1.2)	4.55	.03	
Sex (% male)	88.8%	91.5%	0.36	.55	
Race/ethnicity			3.17	.37	
White	82.7%	73.3%			
Black	5.3%	10.0%			
Hispanic	5.8%	6.7%			
Other	6.2 %	10.0%			
Education			3.80	.15	
High school	18.2%	27.1%			
Some college/college graduate	70.2%	67.8%			
Graduate school	11.6%	5.1%			
Married/living w/partner	53.8%	55.2%	0.04	.85	
Service duty			2.88	.09	
Active duty	27.0%	39.6%			
National Guard or reserves	73.0%	60.4%			
Combat experiences score*	36.1 (2.0)	50.9 (1.1)	43.38	<.001	0.99
Postdeployment social support score*	57.6 (0.7)	47.5 (1.3)	49.30	<.001	1.02
Unit support score*	42.9 (0.8)	35.7 (1.5)	16.76	<.001	0.60

*Groups differ, $P<.05$; mean scores on combat experiences, psychosocial difficulties, postdeployment social support, and unit support scales are adjusted for age. d = Cohen's d estimate of effect size of group difference. PTSD, posttraumatic stress disorder.

change ($\beta = -0.21$, $t = 2.15$, $P = .033$) were negatively associated with depressive symptoms, but the other subscales were not (all βs $< .13$, all ts < 1.39, all Ps $> .17$).

DISCUSSION

To our knowledge, this is one of the first studies of OEF/OIF veterans to examine the relationship between protective factors such as psychological resilience and social support, and traumatic stress and depressive symptoms. Overall, OEF/OIF veterans reported a level of resilience consistent with civilian outpatient primary-care patients, but veterans with PTSD reported lower levels of resilience and unit and postdeployment social support compared to veterans without PTSD. Increased resilience and postdeployment social support were negatively associated with severity of traumatic stress and depressive symptoms, even after controlling for demographic characteristics and combat exposure severity.

The mean resilience score in this sample of OEF/OIF veterans is consistent with that observed in primary-care patients.[14] The mean score of the group without PTSD was between that observed in the general population and primary-care patients, whereas the mean score of the group with PTSD was consistent with that observed in civilian PTSD patients.[14] These findings suggest that OEF/OIF veterans are quite resilient despite having endured war. However, the PTSD group scored more than one full standard deviation lower than the no PTSD group, suggesting that this group may be less hardy or resilient to stress, a finding consistent with previous reports.[14] The most pronounced difference between the PTSD and no PTSD groups was on the CD-RISC subscale personal control, which assesses the extent to which an individual feels in control of his or her life, knows where to turn for help, and has a sense of purpose in their life. This finding corroborates previous reports showing that individuals with PTSD tend to have lower coping self-efficacy compared to individuals without PTSD.[21,22] Lower coping self-efficacy, in turn, has been linked to greater distress, intrusion, and avoidance symptoms,[21] even at 2 years posttrauma.[23] Veterans with PTSD in this study also scored lower on measures of unit support and postdeployment social support, which is consistent with previous studies demonstrating moderate correlations between these measures and PTSD symptoms.[15,16,20]

Higher resilience and postdeployment social support scores were associated with decreased traumatic stress and depressive symptoms, even after controlling for demographic factors and combat exposure. The subscales personal control and acceptance of changes were the only two CD-RISC subscales associated with traumatic stress. This finding is consistent with Bandura's[24] social cognitive theory, which maintains that beliefs about one's capacity to manage and control events in life are important in determining behavioral and affective responses to highly stressful situations. For example, in a study of 600 sexual assault survivors, the only protective factor against PTSD symptoms was survivors' perception that they had greater control over the recovery process.[25] In a study of Israeli recruits, perceived control predicted positive changes in mental

TABLE 2. Means and standard errors on CD-RISC by PTSD status

	No PTSD	PTSD	$F(1, 266)$	P	d
Total resilience score*	77.4 (1.0)	59.5 (2.0)	65.29	<.001	1.08
Personal competence*	25.9 (0.3)	20.1 (0.7)	56.14	<.001	1.05
I work to obtain my goals	3.2 (0.0)	2.3 (0.1)			
When things look hopeless, I don't give up	3.2 (0.0)	2.4 (0.1)			
I believe I can achieve my goals	3.2 (0.0)	2.8 (0.1)			
I take pride in my achievements	3.5 (0.0)	2.7 (0.1)			
I give my best effort no matter what	3.2 (0.0)	2.8 (0.1)			
I like challenges	3.1 (0.1)	2.2 (0.1)			
I think of myself as strong person	3.4 (0.0)	2.5 (0.1)			
I am not easily discouraged by failure	3.0 (0.1)	2.3 (0.2)			
Tolerance of negative affect and stress-related growth*	21.6 (0.3)	17.2 (0.6)	37.86	<.001	0.78
I sometimes have to act on a hunch	2.7 (0.1)	2.5 (0.2)			
I can make unpopular or difficult decisions	3.3 (0.0)	2.8 (0.1)			
I prefer to take the lead in problem solving	3.2 (0.0)	2.6 (0.1)			
I see the humorous side of things	3.0 (0.1)	2.4 (0.1)			
I believe coping with stress strengthens me	2.9 (0.1)	2.1 (0.2)			
I can handle unpleasant feelings	3.1 (0.0)	2.5 (0.2)			
Under pressure, I can focus and think clearly	3.2 (0.0)	2.3 (0.1)			
Acceptance of changes*	16.3 (0.2)	12.5 (0.4)	59.43	<.001	1.03
I am able to adapt to change	3.2 (0.1)	2.6 (0.1)			
I can deal with whatever comes my way	3.3 (0.0)	2.6 (0.1)			
Past success gives me confidence for new challenges	3.3 (0.0)	2.4 (0.1)			
I have close and secure relationships	3.2 (0.1)	2.5 (0.2)			
I tend to bounce back after illness or hardship	3.2 (0.0)	2.3 (0.2)			
Personal control*	9.0 (0.2)	5.5 (0.3)	89.84	<.001	1.44
I am in control of my life	3.0 (0.1)	1.8 (0.1)			
I know where to turn for help	3.0 (0.1)	1.9 (0.0)			
I have a strong sense of purpose	3.0 (0.1)	1.7 (0.1)			
Spiritual orientation to the future	4.6 (0.1)	4.1 (0.3)	1.83	.19	0.21
I believe that sometimes fate or God can help me	1.8 (0.1)	1.8 (0.2)			
I believe things happen for reason	2.8 (0.1)	2.3 (0.2)			

*Groups differ, $P<.05$; all scores adjusted for age. d = Cohen's d estimate of effect size of group difference. CD-RISC, Connor–Davidson Resilience Scale; PTSD, posttraumatic stress disorder.

TABLE 3. Predictors of traumatic stress symptom severity in the full sample

	F, P	R^2	β	t	P
Step 1	2.01, .08	.03			
Age			−.11	1.86	.06
Race/ethnicity (White versus other)			−.03	0.59	.55
Education (no college versus college)			.07	1.26	.21
Relationship status (no versus yes)			−.05	0.82	.41
Duty type (reserve versus active)			.07	1.21	.23
Step 2*	6.49, <.001	.15			
Combat Experiences Scale*			.34	4.98	<.001
Step 3*	16.35, <.001	.43			
Unit support			.05	0.85	.40
Postdeployment social support*			−.31	4.55	<.001
Resilience*			−.34	4.98	<.001

*Statistically significant predictor of PCL-M scores, $P<.001$. PCL-M, Posttraumatic Stress Disorder Checklist—Military Version.

health over the course of an intense 4-month combat training period, with these changes mediated by reduced appraisal of threat and the use of problem-solving and support-seeking strategies.[26] Individuals with high perceived control also tend to seek positive solutions to problems by using active rather than passive coping mechanisms,[27] which promotes greater self-efficacy and decreases risk for PTSD.[28] Taken

together, these findings underscore the importance of cognitive-behavioral interventions that promote perceptions of control and self-efficacy, encourage positive appraisals and acceptance of change, and increase adaptive coping strategies in individuals with PTSD.[29] One example of such an intervention is well-being therapy, which focuses on enhancing personal growth, purpose in life, autonomy, self-acceptance, and positive relations with others, and has been shown to improve symptoms associated with mood and anxiety disorders.[30] Postdeployment social support was also negatively associated with traumatic stress and depressive symptoms, which suggests that efforts to enhance social support and help veterans learn how to seek out social support may be effective in reducing the negative impact of traumatic stress.

It is likely that resilience and social support operate in concert with one another to reduce the likelihood of developing trauma-related psychopathology. A previous study of a nationally representative sample of 1,632 Vietnam veterans similarly found that hardiness and postwar social support were negatively associated with PTSD symptoms and that functional social support accounted for a substantial amount of the indirect effect of hardiness on PTSD.[4] This finding is consistent with reports that individuals who are resilient to stress tend to be skilled at constructing social networks and seeking out social support in times of need.[4, 27, 31] Of note, in this study, the magnitude of the association between resilience and traumatic stress symptoms ($\beta = -.34$) was equal to that between combat exposure severity and traumatic stress symptoms ($\beta = .34$). This suggests that efforts to promote psychological resilience may help counteract the potentially deleterious effect of combat exposure on the development of traumatic stress and related symptoms.

Psychological resilience and social support may be protective against traumatic stress and depressive symptoms by improving emotional regulation, decreasing fear-related appraisals and cognitions, promoting cognitions that the world is safe and nonthreatening, enhancing self-efficacy and control,[5] and decreasing hypothalamic–pituitary–adrenal axis reactivity[32–34] and stress-related physiological arousal.[35,36] Resilience is also related to active task-oriented coping,[37] which may enhance adaptation to stress by decreasing avoidance symptoms, behavioral withdrawal, and emotional disengagement.[5,38] Further research is needed to examine interrelationships among these biological factors, resilience, social support, and stress-related disorders.

Methodological limitations of this study must be noted. First, the generalizability of these results may be limited, as the response rate to the survey was relatively low, respondents were older than nonrespondents, only data on age of nonrespondents were recorded, and the sample was ethnically and geographically homogeneous. The reasons for this low response rate are not entirely clear, but may be related to the length of the survey, which included more than 200 questions. Second, PTSD status was determined using a strict method, which required respondents to score ≥ 50 and meet B, C, and D criteria. Thus, when less strict methods of classification are used, individuals with PTSD will likely report higher levels of resilience and/or social support. Third, only a select number of measures of psychological resilience and social support were administered. Because these constructs are multidimensional, more research using a broader array of these types of measures and employing analytic methods such as structural equation modeling may be helpful in elucidating the complex interrelationships among these variables. For example, one may examine the possibility that more resilient individuals attract more social support, which in turn decreases traumatic stress and depressive symptoms, and that individuals with increased traumatic stress and depressive symptoms may be less resilient and in turn less able to garner postdeployment social support. Fourth, the subscales of the CD-RISC in this study were drawn from the original publication of this instrument, which derived these subscales using exploratory factor analysis.[14] Confirmatory factor analytic studies are needed to examine the factor structure of the CD-RISC and other measures of resilience and social support in military samples. Finally, the cross-sectional nature of this study precluded examination of the temporal association between resilience, social support, and PTSD/depressive symptoms. Longitudinal studies are needed to examine whether resilience and support factors do in fact protect PTSD/depressive symptoms or whether individuals with PTSD/depressive symptoms perceive themselves as less resilient and having less social support.

Despite these limitations, this study is among the first to examine adaptive aspects of recovery from combat and the importance of resilience and social support in protecting against traumatic stress and depressive symptoms in OEF/OIF veterans. Given the low response rate to the survey employed in this study, future research should endeavor to replicate these findings in larger, more representative samples of OEF/OIF veterans as well as in other military and civilian populations, examine specific roles of protective factors in mitigating psychopathology and functioning, and develop and test the efficacy of preventive and treatment interventions designed to bolster resilience and social support in veteran and other trauma-exposed populations.

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